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इनहिबिट टाइप स्पिन्दल ऑयल — विशिष्टि  
( पहला पुनरीक्षण )

Inhibited Type Spindle Oils —  
Specification  
( First Revision )

ICS 75.100

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## FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards after the draft finalized by the Lubricants and their Related Products Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

This standard was originally published in 1986 and amended in 2013.

The requirements of general purpose machinery and spindle oils (non-additive type) are covered in IS 493 (Part 1), 'Specification for general purpose machinery and spindle oils: Part 1 Machinery oils and IS 493 (Part 2), 'Specification for general purpose machinery and spindle oils: Part 2 Spindle oils. With the advancement in machine tool technology and the introduction of sophisticated precision equipment, the stress on the lubricant in terms of machine speed, load and temperature has increased considerably. Keeping in view the application requirements and the environmental operating conditions, a need was felt to design the general purpose lubricants to provide adequate anti-rust protection coupled with oxidation/thermal stability. This specification accordingly covers the requirements of spindle oils which have been fortified with additives to provide the desired service.

In this revision, clauses for references and marking have been updated. Thermal stability test has also been updated. Amendment No.1 issued in 2013 is included.

The composition of the technical committee responsible for the formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

# Indian Standard

## INHIBITED TYPE SPINDLE OILS — SPECIFICATION

( First Revision )

### 1 SCOPE

This standard prescribes the requirements and method of test for inhibited type of spindle oils.

**1.2** The standard is basically intended to cover lubricants for use in high speed textile and wood working machine spindle bearings and high speed machine tool bearings. Other applications include lubrication of timing gear cases, positive displacement blowers and for tracer mechanism and hydraulic system of high precision machine tools.

### 2 REFERENCES

The following Indian Standards contain provisions which through reference in this text constitute the provisions of the standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	Title
1447 (Part 1) : 2000	Petroleum and its products — Methods of sampling: Part 1 Manual sampling ( <i>first revision</i> )
1448	Methods of tests for petroleum and its products
(Part 2) : 2007/ISO 6619 : 1988	Methods of test for petroleum and its products: Part 2 Petroleum products and lubricants — Neutralization number — Potentiometric titration method ( <i>second revision</i> )
(Part 4/Sec 1) : 2008	Petroleum products — Determination of ash ( <i>second revision</i> )
(Part 10/Sec 2) : 2013/ISO 3016 : 1994	Cloud point and pour point, Section 2 Determination of pour point ( <i>second revision</i> )
(Part 12) : 2013/ISO 2049 : 1996	Determination of colour (ASTM Scale) ( <i>second revision</i> )

IS No.	Title
(Part 15) : 2004/ISO 2160 : 1998	Petroleum products — Corrosiveness to copper — Copper strip test ( <i>third revision</i> )
9Part 25/Sec1) : 2018/ISO 3104 : 1994	Transparent and opaque liquids, Section 1 Determination of kinematic viscosity and calculation of dynamic viscosity ( <i>second revision</i> )
[P: 69]:2013/ISO 2592 : 2000	Determination of flash and fire points — Cleveland open cup method ( <i>first revision</i> )
(Part 96) : 2019	Petroleum products and lubricants — Petroleum oils and other fluids — Determination of rust-preventing characteristics in the presence of water ( <i>first revision</i> )
9466 : 1980	Viscosity classification of industrial liquid lubricants

### 3 GRADES

This standard includes 5 viscosity grades as mentioned in IS 9466 and as distinguished by the prescribed viscosity limits given in Table 1.

### 4 REQUIREMENTS

#### 4.1 General

The material shall be made from refined mineral oils. It shall be clear, bright and free from water, dirt and other suspended impurities.

**4.2** The oil shall also comply with the requirements given in Table 1, when tested according to the methods given in column 8 of the table.

### 5 PACKING AND MARKING

#### 5.1 Packing

The material shall be packed in metal or any other suitable containers as agreed to between the purchaser and the supplier.

## 5.2 Marking

**5.2.1** Material shall be marked with the following information:

- Name and type of material;
- Manufacturer's name, initials or trade-mark, if any;
- Net mass of material;
- Identification in code or otherwise to enable the lot of consignment or manufacture to be traced back from records; and
- Any other statutory requirements.

### 5.2.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the

*Bureau of Indian Standards Act, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.*

## 6 SAMPLING

Representative samples of the material shall be drawn as prescribed in IS 1447 (Part 1).

### 6.1 Number of Tests

All characteristics given in the specification shall be tested on the composite sample.

### 6.2 Criteria for Conformity

The lot shall be declared as conforming to the requirements of the specification if all the test results on the composite sample meet the relevant specification requirements.

**Table 1 Requirements for Inhibited Type Spindle Oils**

( Clause 3 and 4.2 )

SI No.	Characteristics	Requirements					Method of test, ref to IS 1448 (Part) / Annex
		Grade VG 2	Grade VG 5	Grade VG 10	Grade VG 15	Grade VG 22	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Kinematic viscosity in mm <sup>2</sup> /s at 40°C	1.98 to 2.42	4.14 to 5.06	9.0 to 11.0	13.5 to 16.5	19.8 to 24.2	(Part 25/Sec1)
ii)	Viscosity index, <i>Min</i>	90	90	90	90	90	(Part 25/Sec1)
iii)	ASTM colour, <i>Max</i>	2.0	2.5	3.0	3.0	3.5	(Part 12)
iv)	Flash point (PMCC), °C, <i>Min</i>	70	70	—	—	—	(Part 21)
v)	Flash point (COC), °C, <i>Min</i>	—	—	130	140	160	(Part 69)
vi)	Pour point, °C, <i>Max</i>	0	0	0	0	0	(Part 10/Sec 2)
vii)	Ash, percent by mass, <i>Max</i>	0.2	0.2	0.2	0.2	0.2	(Part 4/Sec 1)
viii)	Total acidity, mg KOH/g, <i>Max</i>	0.5	0.5	0.5	0.5	0.5	(Part 2)
ix)	Inorganic acidity	Nil	Nil	Nil	Nil	Nil	(Part 2)
x)	Copper strip corrosion at 100°C, for 3h, <i>Max</i>	1	1	1	1	1	(Part 15)
xi)	Rust test, distilled water, 60°C, 24h	Pass	Pass	Pass	Pass	Pass	(Part 96) (Procedure A)
xii)	Thermal stability test						Annex A
	a) Viscosity change in percent, <i>Max</i>	2.0	2.0	2.0	2.0	2.0	
	b) Change in total acidity, <i>Max</i>	0.05	0.05	0.05	0.05	0.05	
	c) Precipitate or sludge	None	None	None	None	None	
	d) Condition of steel rod	No deposit or discolouration					
	e) Condition of copper rod <sup>1)</sup> , <i>Max</i>	1	1	1	1	1	
	f) Increase in ASTM colour, <i>Max</i>	2	2	2	2	2	

NOTE

<sup>1</sup> IS 1448 (Part 15) Colour class.

## ANNEX A

[ Table 1, Sl No. (xii) ]

## THERMAL STABILITY TEST

**A-1 MATERIALS**

**A-1.1 Copper (99.9 percent Electrolytic Copper) and Steel (1 Percent Carbon) Rods** — 6.35 mm diameter × 76.2 mm long.

**A-1.2 Breakers** — 100 ml capacity.

**A-1.3 Pyrex Glass Tray**

**A-1.4 320 Grit Abrasive Cloth or Fine and Very Fine Grade Emery Paper**

**A-1.5 Waterproof Silicon Carbide Paper (No. 320)**

**A-1.6 Facial Tissue Paper**

**A-1.7 Acetone** — Analytical grade.

**A-2 PROCEDURE**

**A-2.1** Cleaning of rods is accomplished by using 320 grit abrasive cloth or emery paper to remove all surface contamination and bring surface to a bright copper and/or steel appearance. Rods should be placed in a drill chuck or other suitable means of rotation. The rods are then further polished with waterproof silicon carbide paper (grit No. 320). Handling of the rods in the polishing operation should be with white cotton gloves or with facial tissue paper. Previously used rods can be used again after adequate cleaning to prevent contamination of the sample tested. The polished rods are to be washed individually with acetone, dried and placed in 100 ml beaker.

**A-2.2** Polished copper and steel rods are to be placed in a clean 100 ml beaker so that rods are in contact with each other at the midpoint of each rod (so as to form an X).

**A-2.3** Approximately 50 ml of the lubricant to be tested is introduced in the beaker so that the lubricant level is slightly above contact point of the rods. The beaker and contents are placed in a suitable Pyrex glass tray in an electric gravity convection oven for 72 h. The oven temperature is maintained at  $101 \pm 1$  °C. The Pyrex tray shall have sufficient wall height to prevent hot spots on the oil samples caused by eddy current. Upon completion of the specified time in the oven, the sample(s) is/are removed and allowed to cool to room temperature before proceeding.

**A-3 EVALUATION****A-3.1 Copper and Steel Rods**

Rods are removed and inspected immediately for any precipitate accumulation. Rods are then wiped with tissue paper. The steel rod is examined visually for deposits or discolouration and copper rod is rated as per colour class described in IS 1448 (Part 15).

**A-3.2 Precipitate Evaluation**

The heat tested oil sample is transferred to another suitable beaker and the original beaker is inspected for precipitate or deposit.

**A-3.2.1** Any presence of precipitate or deposit or glassware is a cause for rejection.

**A-3.3 Viscosity Change** — As per IS 1448 ( Part 25/Sec 1 ) and percentage viscosity change is to be determined.

**A-3.4 Total Acidity** — To be determined as per IS 1448 (Part 2).

**ANNEX B***( Foreword )***COMMITTEE COMPOSITION**

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This Indian Standard has been developed from Doc No.: PCD 25 (14337).

### Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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Published by BIS, New Delhi